## INDEX TO VOLUMES 8 and 9

### Sept. 14, 1960—May 17, 1961

# Science World

**Edition 2**

Note: Letters indicate month (S-Sept., O-Oct., N-Nov., D-Dec., J-Jan., F-Feb., Mr-Mar., Ap-Apr., My-May). First figure indicates date of issue. Number after the dash refers to page number. Example: S14-9 means Sept. 14, page 9. An asterisk * indicates major articles, C indicates Cover, (N) indicates Science in the News, T indicates Teacher Edition.


A

**Abominable Snowman:** see **Animals, Mythical.**

**Air Pollution:** *Chemistry of Smog (Simon Dresner, diagrams) N30-6; Effects of Ozone (A. Joseph, diagram) N30-24.

**Algae:** see also **Plankton, Plants.** Man in Sealed-Tank Oxygen Test (N) Ap19-26.

**Ampere, Andre-Marie:** Biographical Sketch Ap5-27.

**Amphibians:** Experiments with Frogs and Tadpoles Mr15-24; Frog Mr15-C; Project: Survival in a Population of Tadpoles (John Young) Mr15-23.

**Animal Behavior:** *Animal Communication (James Wiley, diagrams) Mr1-8; Dethier, Dr. Vincent G. (Biographical Sketch) Mr15-19; Insect Sounds Vary with Temperature (letter) Ap19-25; Planaria Responses to Electricity (A. Joseph) D14-26; Project: Study of Planaria (Robert Milanovich) J11-20; *Salmon Migration (Jack Sussman, diagrams) N9-9; *Sound Beyond Hearing (Simon Dresner, diagrams) J11-4.

**Animals:** Chimp Rocketed into Space (N) Mr1-16; Dog Gets Rabies (letter) F1-4; Operation Save-a-Buck in Florida (N) F15-20; Timber Destruction (N) Ap5-16.

**Animals, Mythical:** Abominable Snowman Scalp (N) J11-24; Myth (N) F1-19.

**Antarctica:** *Deep Freeze: Lab for Life Study (Walter Stacey) O26-12; Fossils Found on Ross Ice Shelf (N) J11-24; *Probing One Hundred Million Winters (William J. Cromie, diagram, map) O26-6; Special Issue O26.

**Appel, Fredric:** *Life in a Germfree World (diagram) My17-6; Schwarzschild, Dr. Martin Mr1-18; Shapiro, Dr. Harry L. My3-22; Tombaugh, Dr. Clyde W. F15-22; Vishniac, Dr. Roman Ap5-18.

**Archaeology:** see also **Fossils.** Brill, Dr. Robert (Biographical Sketch) My17-20; Leakey Report (N) F1-19, Mr15-17; *Tiny Tools of Juet Island (Moreau S. Maxwell, diagram, map) F15-10.

**Architects of Science:** see also **Today's Scientists.** Ampere, Andre-Marie Ap5-27; Avogadro, Amedeo Ap5-27; Bunsen, Robert F1-26; Cavendish, Henry J11-29; Einstein, Albert Mr15-30; Herschel, William F15-27; Jansky, Karl G. My3-30; Kirchhoff, Gustav R. F1-26; Koch, Robert My17-28; Lemaitre, Abbe Georges E. Ap5-27; Maskelyne, Nevil J11-29; Mohorovicic, Andrija My17-28; Newton, Sir Isaac Mr15-30; Pascal, Blaise Mr15-30; Peltier, Jean F15-27; Seebeck, Thomas F15-27; Spallanzani, Lazzaro J11-29; Tyndall, John Mr1-26; Weismann, August F1-26.

**Architecture:** Project: Study of the Load Bearing Abilities of Columns (Timothy Downing) F1-21.

**Artificial Satellites:** Capsule Recovered from Mid-Air (N) N30-19; Echo Message Bounce (N) S28-19; Friedman, Dr. Herbert (Biographical Sketch) S14-20; Number Now in Orbit (letter) Ap19-25; Payload Recovered (N) S28-18.

**Asimov, Isaac:** *ABC's of the Elements (chart) N9-14; *Life of the Cell (diagrams) S14-5; *Smaller Than the Atom (diagrams) Mr15-6.

**Astronauts:** see **Space Flight.**

**Astronomy:** see also **Astrophysics, Moon, Sun,** etc. *Antarctica: Window in a Magnetic House (Simon Dresner, diagrams) O26-9; *Challenge of the Universe (Nicholas Rosa, diagrams) Ap5-4; Density of Saturn (letter) N30-30; Does Earth Have Tail Like a Comet? (N) F15-21; Earth's Rotation (letter) J11-27; French Moon Mapping Program (N) O12-18; *Hello Out There (T. Benjamin) S28-26; Life in the Universe (N) N30-19; *Meteorites: New Clues to Old Mysteries (Nicholas Rosa, diagram) F1-13; Moon Dust Layer Not Uniform (N) Ap5-16; Project Ozma Off (N) Ap5-16; *Radio Window on the Universe (Nicholas Rosa, diagrams) My3-4; Rocket Astronomy Experiment (A. Joseph, diagram) S14-25; Russia Releases Map of Far Side of Moon (N) D14-21; Schwarzschild, Dr. Martin (Biographical Sketch) Mr1-18; *To the Stars and Beyond (Nicholas Rosa, diagram) Ap19-11; Tombaugh, Dr. Clyde W. (Biographical Sketch) F15-22.

**Astrophysics:** Friedman, Dr. Herbert (Biographical Sketch) S14-20; Roberts, Dr. Walter Orr (Biographical Sketch) O26-16.

**Atmosphere:** *Chemistry of Smog (Simon Dresner, diagrams) N30-6; Project: Psychological Effects of Positive and Negative Ions (David Hunt) My3-23.

**Atom Smashers:** Brookhaven, World's Largest (N) S14-18; Project: A Linear Particle Accelerator (Joseph Golden) O12-25; Student Builds (N) S14-18.

**Atomic Bombs:** Photos of Hiroshima and Nagasaki Bombs (N) F15-21.

**Atomic Calendar:** Libby, Dr. Willard (Biographical Sketch) J11-18.

**Atomic Particles:** Glaser, Dr. Donald (Biographical Sketch) F1-20; Measuring Molecules Experiment (A. Joseph) S14-25; Project: A Linear Particle Accelerator (Joseph Golden) O12-25; *Search for the Building Blocks of Matter (Simon Dresner) S14-9; *Smaller Than the Atom (Isaac Asimov, diagrams) Mr15-6.

**Atomic Structure:** *ABC's of the Elements (Isaac Asimov, chart) N9-14; *Glue of Matter (Michael Dadin, diagrams) S28-14; *Smaller Than the Atom (Isaac Asimov, diagrams) Mr15-6.

**Atomic Submarines:** Baseball Game at North Pole (N, diagram) S28-18.

**Aurora:** see **Astronomy.**

**Aviation:** Drone SD-1 (N) Ap5-16; Aerocar (N) Ap5-16; X-15 Record Flight (N) S28-19.

**Avogadro, Amedeo:** Avogadro's Number (letter) Ap5-26; Biographical Sketch Ap5-27.

B

**Bacteria:** Food Spoilage (letter) O26-23; *Life at 5,000 Fathoms (William Richards, diagram) O12-9; *Life in a Germfree World (Fredric Appel, diagram) My17-20; Project: Factors Affecting the Development of Bacterial Resistance to Antibiotics (Mary Sue Wilson) O12-23; Project: Mutations in E. coli (John Schaefer) Ap19-29.

**Bees:** see also **Insects.** Death after Stinging (letter) N30-30; Language of (N) Ap19-26; Project: New Research on the Properties of Royal Jelly (Kenneth Shearon) N30-21.

**Benjamin, Theodore:** see **Meeting the Test, Processes of Science.**

**Beryllium:** *Wonder Metal of the Space Age (Simon Dresner, diagram) Ap19-4.

**Biographical Sketches:** see **Architects of Science, Today's Scientists.**

**Biological Clocks:** *Deep Freeze: Lab for Life Study (Walter Stacey) O26-12.

**Birds:** Churk (N) N30-18; Double Yolk in Egg (letter) N9-2.

**Blood:** Hardening of the Arteries (letter) F15-4.

**Boy Scouts:** Kent Goering to Winter at Camp Century (N) O12-19.

**Brain Teasers:** see issues.

**Bunsen, Robert:** Biographical Sketch F1-26.

**Burnet, Sir Macfarlane:** Wins Nobel Medicine Prize (N) N9-20.

**Butler, James (Biographical Sketch):** Dethier, Dr. Vincent G. Mr15-19.

**Butterflies:** see also **Insects.** Project: Life History of the Butterfly, Euptychia mitchellii (Stephen Hubbell & Thomas Pliske) S14-21.

C

**Calendars:** see also **Atomic Calendar.** Diagrams J11-C.

**Camera:** see also **Photography.** New X-Ray Type (N) Mr1-16.

**Camp Century:** see **Greenland.**

**Cancer:** Links Virus to 10 Forms (N) O12-19; Malignant Tissues Absorb More Radiation (letter) O26-23, D14-28.

**Carbon 14:** see **Atomic Calendar.**

**Carroll, Walter (Biographical Sketch):** Sabin, Dr. Albert S28-20.

**Cartography:** see **Mapping.**

**Case, L. L. (Biographical Sketch):** Coates, Christopher D14-22.

**Cavendish, Henry:** Biographical Sketch J11-29.

**Cells:** *ATP: Energy Reservoir (Zachariah Subarsky, diagrams) Ap5-9; Diagram S14-C; *From Egg to Embryo (Walter Stacey, diagrams) F1-10; *Life of the Cell (Isaac Asimov, diagrams) S14-5; Malignant Tissues Absorb More Radiation (letter) O26-23, D14-28.

**Cepheid Variables:** *To the Stars and Beyond (Nicholas Rosa, diagram) Ap19-11.

**Chemical Energy:** *Fuel Cell: Chemical Power Plant (Simon Dresner, diagrams) O12-13.

**Climate:** Earth Cooling Off? (N) F15-21; *Ice Age Coming? (Nicholas Rosa, diagram, map) Mr1-4; Projects in Weather and Climate (A. Joseph, diagrams) Mr1-22.

**Coates, Christopher:** Biographical Sketch D14-22.

**Combustion:** *Fire (Simon Dresner, diagrams) D14-15; Flame Tests (T. Benjamin) D14-19.

**Computers:** Electronic Device Plots Weather Maps (N) F1-19; Helps Break Bends Barrier (N) J11-25; Monte Carlo Method S14-16.

**Conant, Dr. James B.:** Science Teaching Report N9-1T.

**Corrosion:** Project: Corrosive Effects of Brackish Water (Harold Dodgen) Ap5-19.

**Cosmic Rays:** see also **Radiation.** *Antarctica: Window in a Magnetic House (Simon Dresner, diagrams) O26-9; Diagram N30-C; *High Energy from Outer Space (Harold Sloane, diagrams) N30-14.

**Cowen, Robert C.:** *Tsunami (diagrams, map) S14-9.

**Cromie, William J.:** Antarctica (Introduction) O26-5; *Probing One Hundred Million Winters (diagram) O26-6; *World Ocean: Three-Dimensional Puzzle (diagram, map) D14-6.

**Crossword Puzzles:** see issues.

**Cryptography:** Association Met in N. Y. (N) O12-20.
**Crystals:** see **Snowflakes.**
**Cyclotron:** see **Atom Smashers.**

D

**Dadin, Michael:** *Glue of Matter (diagrams) S28-15.
**Demonstrations and Experiments:** see also **Project Pointers.** Acceleration Timer N9-8T; Analysis of Motion N9-8T; Auxin O12-4T; Bee Hive Ap19-7T; Biological Clocks O26-10T; Cepheid Variables Ap19-7T; Contours N9-8T; Culturing Soil Bacteria N30-3T; Earth Currents O26-9T; Flame Propagation D14-3T; Freehand Sections Ap5-2T; Fuel Cell O12-6T; Insect Experiments N30-10T; Isotopes J11-8T; Longitudinal Waves F15-6T; Model of Nerve Conduction D14-3T; Nitrogen-Fixing Bacteria N30-3T; Photographing Cosmic Rays N30-10T; Phototropism O12-6T; Regeneration J11-8T.
**Dethier, Dr. Vincent G.:** Biographical Sketch Mr15-19.
**Diving:** Bends Barrier Broken (N) J11-24.
**DNA:** see **Cells.**
**Dreams:** Length of (letter) Mr15-4.
**Dresner, Simon:** *Antarctica: Window in a Magnetic House (diagrams) O26-9; *Atomic Pumps: Maser and Laser (diagrams) Mr1-11; *Beryllium: Wonder Metal of the Space Age (diagram) Ap19-4; *Chemistry of Smog (diagrams) N30-7; *Earth's Gravity (diagrams) S28-6; *Fire (diagrams) D14-15; *Fuel Cell: Chemical Power Plant (diagrams) O12-13; *Glass: Rigid Fluid (diagrams) Ap5-12; *Ion Engine (diagram) My3-13; *Measuring with Light (diagrams) F1-6; *Search for the Building Blocks of Matter S14-13; *Sound Beyond Hearing (diagrams) J11-4; *Thermoelectricity (diagrams) F15-14; *Tracking Down Radiation (diagrams) My17-14.
**Dry Ice:** Making in Lab (letter) O12-21.
**Dubos, Dr. Rene J.:** Biographical Sketch N30-20.

E

**Earth:** see also **Geology, Oceanography.** *Crack That Girdles the Earth (Richard Starnes, diagram, maps) O12-4; Diagram F15-C; Does It Have Tail Like a Comet? (N) F15-21; *Earth's Gravity (Simon Dresner, diagram) S28-6; Ewing, Dr. Maurice (Biographical Sketch) Ap19-28; Moho (N) F1-18; Project: Astronomical Measurements of the Earth (Franklin F. Wilcox) S14-23; *Race to Inner Space (Nicholas Rosa, diagram) My17-10; Rotation (letter) J11-27; *Seismic Waves: Key to the Inner Earth (Nicholas Rosa, diagrams) F1-6; Stretching or Shrinking (N) O26-26; *Weighing the Earth (Nicholas Rosa, diagrams) J11-13.
**Earthquakes:** see also **Seismology.** *Seismic Waves: Keys to the Inner Earth (Nicholas Rosa, diagrams) F15-6; *Tsunami (Robert C. Cowen, diagrams, map) S14-9; Wave Experiment (A. Joseph, diagram) F15-25.
**Earth Satellites:** see **Artificial Satellites.**
**Ebert, Dr. James:** Biographical Sketch O12-22.
**Ecology:** *Hunger: World Problem No. 1 (William Monk, map) My3-9; *Plants and Animals, Inc. (Roy Gallant) Mr15-11.
**Education:** Chem Study (J. A. Campbell & S. Geffner) S28-6T; Chem Study Institutes D14-1T; Chemical Bonds Approach (M. Kent Wilson) S28-8T; Chemical Bonds Approach (correction) O12-6T; Chemical Bonds Progress Report Mr15-8T; Future Scientists of America S28-16T; FSA Programs and Awards S28-14T; Industrial Tour: Teaching Tool (Maitland Simmons) O12-1T; NSTA Convention Program Mr15-9T; NSTA Convention Report My3-1T; NSTA Lab Facilities Study F15-7T; NSTA Science Facilities Study D14-4T; Ph.D. (letter) S28-30; Progress in Biological Sciences Curriculum Study (Zachariah Subarsky) S28-1T; PSSC Program Mr15-1T; Results of Science Students Survey J11-4T; Science Manpower Project O12-11T; Science Youth Month O12-15T; Star Award Cancelled S28-17T; Summer Institute for Biology Teachers J11-11T; Summer Research Opportunities F1-7T; Westinghouse Talent Search N9-8T; Westinghouse Talent Winners (N) Ap5-17; Youth Science Tour (N) My17-19.
**Einstein, Albert:** Biographical Sketch Mr15-30.
**Electric Eels:** see also **Fish.** Coates, Christopher (Biographical Sketch) D14-22.
**Electricity:** Current and Conductors (letter) N30-30; Fiberglass Boom for High Voltage Wire Work (N) J11-25; Planaria Experiment (A. Joseph) D14-26; Project: Electrohydraulic Effect (Rand Evans) My17-21.
**Electromagnetic Waves:** see **Light.**
**Electronics:** Highway Developed by RCA (N) S14-18.
**Electroscope:** *High Energy from Outer Space (Harold Sloane, diagrams) N30-14.
**Elements:** *ABC's of the Elements (Isaac Asimov, chart) N9-14; Einsteinium (letter) O12-21; Function of Elements in Human Body (letter) J11-27; Number (letter) N9-2.
**Embryology:** Chick Embryo O12-C; Ebert, Dr. James (Biographical Sketch) O12-22; Double-Yolked Egg (letter) N9-2; Frog Eggs Experiment (A. Joseph) O12-27; *From Egg to Embryo (Walter Stacey, diagrams) F1-10; Salamander Embryo F1-C; *Search for the Juvenile Hormone (William Monk, diagram) Ap19-8.
**Enders, Dr. John F.:** Measles Vaccine Tested (N) O26-27.
**Energy:** Project: Electrohydraulic Effect (Rand Evans) My17-21.
**Evolution:** Leakey Find (N) F1-19, Mr15-17; *Tiny Tools of Juet Island (Moreau S. Maxwell, diagram, map) F15-10.
**Ewing, Dr. Maurice:** Biographical Sketch Ap19-28.
**Exobiology:** *Hello Out There (T. Benjamin) S28-26; Life in the Universe? (N) N30-19; Project Ozma Off (N) Ap5-16.
**Experimental Error:** *Laws of Chance (Martin Gardner, diagram) Mr15-14.

F

**Falconer, Vera M.:** Films and Filmstrips for the Space Age N30-1T.
**Fire:** see **Combustion.**
**Fish:** Coates, Christopher (Biographical Sketch) D14-22; *Salmon Migration (Jack Sussman, diagrams) N9-9.
**Flies:** see also **Insects.** Dethier, Dr. Vincent G. (Biographical Sketch) Mr15-19; Fireflies Wanted for Research (N) O12-19; Fruit Fly Experiments (A. Joseph, diagram) Mr15-25.
**Food:** Bacteria and Spoilage (letter) O26-23; Device Warns of Spoilage (N) Ap5-17.
**Fossils:** Dr. Leakey Finds More Bones (N) F1-19, Mr15-17; Lobster (N) F15-20; Marine Life Found on Ross Ice Shelf (N) J11-24; Students Find First Gliding Reptile (N) My17-19.
**Friction:** Project: Sliding Friction (Joan Monks) Mr1-20.
**Friedman, Dr. Herbert:** Biographical Sketch S14-20.
**Frogs:** see **Amphibians.**
**Fuel Cell:** *Chemical Power Plant (Simon Dresner, diagrams) O12-13; Experiment (A. Joseph) O12-27.

G

**Gallant, Roy:** *Plants and Animals, Inc. Mr15-11.
**Gardner, Martin:** *Laws of Chance (diagram) Mr15-14.
**Geiger Counter:** And Scintillation Counter (letter) S28-30.
**Generators:** Building Ultrasonic Types (A. Joseph, diagrams) J11-23.
**Genetics:** see also **Cells, Embryology.** Cracking the Code of Heredity (T. Benjamin) Ap19-15; *Plants and Animals, Inc. (Roy Gallant) Mr15-11; Project: Mutations in E. coli (John Schaefer) Ap19-29; *Search for the Juvenile Hormone (William Monk, diagram) Ap19-8
**Geology:** see also **Earth, Oceanography.** *Antarctica: Probing One Hundred Million Winters (William J. Cromie, diagram) O26-6; Earth Stretching or Shrinking (N) O26-26.
**Glaciers:** *Ice Age Coming? (Nicholas Rosa, diagram, map) Mr1-4.
**Glaser, Dr. Donald A.:** Biographical Sketch F1-20; Wins Nobel Prize in Physics (N) N30-18.
**Glass:** Brill, Dr. Robert (Biographical Sketch) My17-20; *Rigid Fluid (Simon Dresner, diagrams) Ap5-12.
**Gravity:** see also **Earth.** *Earth's Gravity (Simon Dresner, diagrams) S28-6; Project: Measuring the Density of Liquids by Sound (Robert Schwartz) J11-19; *Weighing the Earth, Why? (Nicholas Rosa, diagrams) J11-13.
**Greenhouse Effect:** *Ice Age Coming? (Nicholas Rosa, diagram, map) Mr1-4.
**Greenland Icecap:** Boy Scout to Camp Century (N) O12-19.
**Gudemann, Frances (Biographical Sketches):** Ebert, Dr. James O12-22; Dubos, Dr. Rene J. N30-20; Friedman, Dr. Herbert S14-20; Libby, Dr. Willard F. J11-18; Roberts, Dr. Walter Orr O26-16.
**Gulf Stream:** see **Ocean Currents.**

H

**Heat:** Substances Vary (letter) Ap5-26.
**Herschel, William:** Biographical Sketch F15-27.
**Highways:** Electronic System Developed by RCA (N) S14-18.
**Hillary, Sir Edmund:** Abominable Snowman Scalp (N) J11-24; Myth (N) F1-19.
**Hurricanes:** Operation Save-a-Buck in Florida (N) F15-20.
**Hybridization:** Churk (N) N30-18.
**Hydrologic Cycle:** Chemical Blanket Prevents Evaporation (N) O12-20.

I

**Ice:** see also **Dry Ice.** More Volume than Water (letter) O12-21.
**Ice Age:** see **Climate.**
**Immunity:** Dr. Burnet Wins Nobel Prize in Medicine (N) N9-20; Hamster Tissue Transplant (N) D14-20; Skin Grafts (letter) Mr1-24.
**Infrared Rays:** Ray Gun Transmits Voice (N) Mr1-17.
**Insects:** Cecropia Moth Experiments (A. Joseph, diagram) Ap19-34; Dethier, Dr Vincent G. (Biographical Sketch) Mr15-19; Fireflies Wanted for Research (N) O12-19; Giant Silk Worms Wanted for Research (N) F1-18; Project: Life History of the Butterfly (Stephen Hubbell & Thomas Pliske) S14-21; Project: My Experiences with Spiders (David Fears) N9-23; Project: Responses of Mosquito Larvae to Light (Ronald Weintraub) N9-24; *Search for the Juvenile Hormone (William Monk, diagram) Ap19-8; Sounds Vary with Temperature (letter, chart) Ap19-25.
**International Geophysical Year:** see **Antarctica.**
**Ion Engine:** *Ion Engine (Simon Dresner, diagram) My3-13; Scale Model (N) F1-18.

J

**Jansky, Karl G.:** Biographical Sketch My3-30.
**Joseph, Alexander:** see **Project Pointers.**
**Joseph, Richard E. (Biographical Sketch):** Glaser, Dr. Donald F1-20.

K

**Kirchhoff, Gustav R.:** Biographical Sketch F1-26.
**Koch, Robert:** Biographical Sketch My17-28.

L

**Laser:** see also **Light.** *Atomic Pumps: Maser and the Laser (Simon Dresner.

diagrams) Mr1-11; Device to Amplify Light (N) S14-18.
**Leakey, Dr. L.S.B.:** Fossil Report (N) F1-19, Mr15-17.
**Lemaitre, Abbe Georges E.:** Biographical Sketch Ap5-27.
**Letters:** Avogadro's Number Ap5-26; Bacteria and Food Spoilage O26-23; Bee Stinger N30-30; Chicken Pox D14-28; Dog and Rabies F1-4; Double Egg Yolks N9-2; Dowsing Mr15-4; Dream Length Mr15-4; Dry Ice O12-21; Earth Rotation J11-27; Electrical Conductors N30-30; Element Einsteinium O12-21; Elements N9-2; Geiger Counter & Scintillator S28-30; Geotropism O12-21; Gibberellic Acid Mr1-24; Hardening of the Arteries F15-4; Insect Thermometers Ap19-25; Kingdoms of Living Things S14-26; Leaf Stomate F1-4; Light Rays and Mirror S14-26; Magnetic Cooling My3-27; Malignant Tissues and Radiation O26-23; Parasites for Experiments My3-27; Perpetual Motion Machine O26-23; Ph.D. S28-30; Pressure of Sea Water N9-2; Radiation and Cells D14-28; Salt and Sweating S14-26; Satellites in Orbit Ap19-25; Saturn Density N30-30; Skin Grafts Mr1-24; Tooth Enamel F1-4; Trace Elements J11-27; Tsunami (diagram correction) S28-30; Volume and Ice O12-21; Whistlers D14-28.
**Libby, Dr. Willard F.:** Biographical Sketch J11-18; Wins Nobel Prize in Chemistry (N) N30-18.
**Light:** *Atomic Pumps: Maser and Laser (Simon Dresner, diagrams) Mr1-11; Leaf Stomate (letter) F1-4; Leaf Stomate Experiment (A. Joseph) F15-25; *Light and Life (William Richards, diagrams) S28-10; *Measuring with Light (Simon Dresner, diagrams) F1-6; Measuring Wave Length of (T. Benjamin) D14-19; Project: Light Responses of the Dawn Redwood Tree (Lawrence Nelson) F15-23; Project: Responses of Mosquito Larvae to Light (Ronald Weintraub) N9-24; What Is Light? (diagram) S28-13; World Adopts New Length Standard (N) N9-20.

M

**Magnetism:** *Antarctica: Window in a Magnetic House (Simon Dresner, diagrams) O12-9; Theories on (T. Benjamin, diagrams) Ap5-23; Whistlers (letter) D14-28.
**Mapping:** French Moon Mapping Program (N) O12-18; *Measuring and Mapping the Earth (Harold Sloane, diagrams) N9-4.
**Maps:** Antarctica O26-C, O26-5; Calorie Count (World) My3-9; Canada (Juet Island) F15-10; Drake Passage (North America) Ap19-28; Ice Age (World) Mr1-5; Mid-Ocean Rift (World) O12-7; Moon (Far Side) D14-21.
**Marine Life:** see also **Fish.** Experiments (A. Joseph, diagram) My3-26.
**Maser:** see **Laser, Light.**
**Maskelyne, Nevil:** Biographical Sketch J11-29.
**Mathematics:** see also **Numeration.** *Laws of Chance (Martin Gardner, diagram) Mr15-14; Project: Denary-Binary Converter (Eleanor Wagner) Ap5-21.
**Maxwell, Moreau S.:** *Tiny Tools of Juet Island (diagram, map) F15-10.
**Measles:** Vaccine Tested (N) O26-26.
**Measurement:** see also **Astronomy.** By Parallax (A. Joseph, diagram) Ap19-34; *Measuring with Light (Simon Dresner, diagrams) F1-6; New Second (N) D14-20; Project: Measuring the Density of Liquids by Sound (Robert Schwartz) J11-19; World Adopts New Length Standard (N) N9-20.
**Medawar, Dr. Peter:** Wins Nobel Prize in Medicine (N) N9-20.
**Medicine:** see also **Bacteria.** Chicken Pox (letter) D14-28; Hardening of the Arteries (letter) F15-4; *Life in a Germ-free World (Fredric Appel, diagrams) My17-6, Microsurgery (N) N9-21; Nobel Prize Winners (N) N9-20; Skin Grafts (letter) Mr1-24.
**Meeting the Test (Theodore Benjamin):** Quiz on Modern Science S14-17.
**Meteorology:** see also **Climate.** *Antarctica: Probing One Hundred Million Winters (William J. Cromie, diagram) O26-6; Earth Cooling Off (N) F15-21; Electronic Device Plots Maps (N) F1-19; Old Faithful Used in Weather Study (N) Mr15-16; Operation Save-a-Buck (N) F15-20; Producing Antarctic Temperatures (A. Joseph) O26-21; Projects in Weather and Climate (A. Joseph, diagrams) Mr1-22; Project: Watching the Weather (John Rigdon) O26-17; Regelation (A. Joseph) O26-21; Snowflakes Under Microscope (A. Joseph) O26-21.
**Meteors:** see also **Astronomy.** *Meteorites: New Clues to Old Mysteries (Nicholas Rosa, diagram) F1-13; Photographing Meteors (A. Joseph) F1-24.
**Microscope:** Snowflakes Examined (A. Joseph) O26-21; Taking Pictures Through D14-25; Vishniac, Dr. Roman (Biographical Sketch) Ap5-18.
**Microwaves:** System Used by Post Office in Delivery (N) N30-19.
**Migration (Animals and Birds):** *Salmon Migration (Jack Sussman, diagrams) N9-9.
**Missiles:** see **Rockets.**
**Moho:** see **Earth, Oceanography.**
**Mohorovicic, Andrija:** Biographical Sketch My17-28.
**Molecular Structure:** Avogadro's Number (letter) Ap5-26; Role of a Model (T. Benjamin, diagram) Mr1-25.
**Monk, William:** *Hunger: World Problem No. 1 (map) My3-9; *Search for the Juvenile Hormone (diagram) Ap19-8.
**Moon:** Dust Layer Not Uniform (N) Ap5-16; French Mapping Program (N) O12-18; Lunar Suit (N) O26-27; Russia Releases Map of Far Side (N) D14-21.
**Mosquitoes:** see **Insects.**
**Museums:** Hall of Man, American Museum of Natural History (N) Ap19-27; Moebius Band, California Museum of Science and Industry (N) My17-18; Shapiro, Dr. Harry L. (Biographical Sketch) My3-22.

N

**Nerve Cells:** see **Neurons.**
**Neurons:** Experiments (A. Joseph) D14-26; *Venoms: Clue to the Neuron Mystery (William Richards, diagram) D14-11.
**Newton, Sir Isaac:** Biographical Sketch Mr15-30.
**Nitrogen Cycle:** *Our Living Soil (William Richards, diagram) N30-10.
**Nobel Prizes:** Chemistry to Dr. Willard F. Libby (N) N30-18; Dr. Peter Medawar and Sir Macfarlane Burnet Win Prize in Medicine (N) N9-20; Physics to Dr. Donald A. Glaser (N) N30-18.
**Nuclear Fuel:** Production by Centrifuge (N) N9-21.
**Numeration:** see also **Mathematics.** Project: Denary-Binary Converter (Eleanor Wagner) Ap5-21.
**Nutrition:** Dubos, Dr. Rene J. (Biographical Sketch) N30-20; *Hunger: World Problem No. 1 (William Monk, map) My3-9.

O

**Ocean Currents:** Water Convection Demonstration (A. Joseph, diagram) D14-26; Water Temperature Experiment (A. Joseph, diagram) D14-26; *World Ocean: Three-Dimensional Puzzle (William J. Cromie, diagram, map) D14-6.
**Oceanography:** see also **Earth.** Bends Barrier Broken (N) J11-25; Correction on Life Article (letter) N9-2; *Crack That Girdles the Earth (Richard Starnes, diagram, maps) O12-4; Ewing, Dr. Maurice (Biographical Sketch) Ap19-28; *Life at 5,000 Fathoms (William Richards, diagram) O12-9; Marine Life Found on Ross Ice Shelf (N) J11-24; Moho (N) F1-18; *Race to Inner Space (Nicholas Rosa, diagram) My17-10.
**Operation Deep Freeze:** see **Antarctica.**
**Origin of the Universe:** *Challenge of the Universe (Nicholas Rosa, diagrams) Ap5-4.
**Ozone:** see **Air Pollution.**

P

**Paleontology:** see **Fossils.**
**Parachuting:** Kittinger Record Jump (N) S28-19.
**Parallax:** Measurement By (A. Joseph, diagram) Ap19-34.
**Pascal, Blaise:** Biographical Sketch Mr15-30.
**Peltier, Jean:** Biographical Sketch F15-27.
**Perpetual Motion:** Building a Machine (letter) O26-23.
**Photography:** see also **Photomicrography.** Meteors (A. Joseph) F1-24; X-Ray Camera Takes Movies of Moving Bullet (N) Mr1-16.
**Photomicrography:** Project: Specialized Instrument for Photomicrography (Walter Jesewski) D14-23; Vishniac, Dr. Roman (Biographical Sketch) Ap5-18.
**Photosynthesis:** see also **Plants.** *Light and Life (William Richards, diagrams) S28-10.
**Phototropism:** *Light and Life (William Richards, diagrams) S28-10.
**Plankton:** see also **Plants.** *Hunger: World Problem No. 1 (William Monk, map) My3-9.
**Plants:** see also **Phototropism.** Gibberellic Acid Experiment (letter) Mr1-24; Grow Upward (letter) O12-21; Leaf Stomate and Light (letter) F1-4; Leaf Stomate and Light Experiment (A. Joseph) F15-25; *Light and Life (William Richards, diagrams) S28-10; Nitrates and Growth (A. Joseph) N30-24; Project: Light Responses of the Dawn Redwood Tree (Lawrence Nelson) F15-23; Project: Studies of a Root Growth Factor from Seedlings (Susan Brown) Mr1-19.
**Pluto:** Tombaugh, Dr. Clyde W. (Biographical Sketch) F15-22.
**Poliomyelitis:** Sabin, Dr. Albert (Biographical Sketch) S28-20.
**Population:** *Hunger: World Problem No. 1 (William Monk, map) My3-9.
**Processes of Science (Theodore Benjamin):** Cracking the Code of Heredity (diagram) Ap19-15; Flame Tests D14-19; Hello, Out There (Valid Conclusions) S28-26; How and Why (Explanations) F1-17; How Scientifically Do You Think? (Conclusions) N30-25; Indirect Determination (diagram) Mr15-18; Making a Spectroscope (diagram) D14-19; Measuring Wave Length of Light D14-19; Pitfalls of the Scientist My3-21; Role of a Model (diagram) Mr1-25; Snow Crystal Symmetry (diagrams) F15-18; Some Theories on Magnetism (diagrams) Ap5-23; Time, Place, and Science (History of Science) J11-26; Twinkle, Twinkle Little Star (Spectroscope) O26-22; Using What You Know My17-26; Why? (Interpret Observations) O12-17, N9-19.
**Project Mercury:** see **Space Flight.**
**Projects and Experiments:** see **Tomorrow's Scientists.**
**Project Pointers (Alexander Joseph):** Amateur Archaeology F15-25; Cecropia Moth Experiments (diagrams) Ap19-34; Earthquake Waves Experiment F15-25; Effects of Ozone (diagram) N30-24; Embryology (Frog Eggs) O12-27; Fresh Water from Salt by Freezing (diagram) D14-26; Fruit Fly Experiments (diagram) Mr15-25; Make a Fuel Cell O12-27; Make a Seismograph (diagram) O12-27; Marine Life Experiments (diagram) My3-26; Measuring Molecules S14-25; Neuromuscular Experiments D14-26; Nitrates and Plant Growth N30-24; Optical Range Finder (directions, diagram) N9-27; Photographing Meteors F1-24; Producing Antarctic Temperatures O26-21; Projects in Weather and Climate (diagrams) Mr1-22; Regelation O26-21; Research in Photoperiodism F15-25; Rocket Astronomy S14-25; Snowflakes Under Micro-

scope O26-21; Surface Area Experiments (diagrams) F1-24; Thermoelectricity Experiment (diagram) F15-25; Tsunami (diagram) S14-25; Ultrasonic Generators (diagram) J11-23; Water Temperatures Vary (diagram) D14-26.

R

**Radiation:** see also **Cosmic Rays.** Glaser, Dr. Donald (Biographical Sketch) F1-20; Malignant Tissues Absorb More (letters) O26-23, D14-28; Space Mice Test (N) O26-26; Model R. R. Used in Experiments (N) Mr15-16; *Tracking Down Radiation (Simon Dresner, diagrams) My17-14.

**Radio Telescopes:** see also **Astronomy.** *Radio Window on the Universe (Nicholas Rosa, diagrams) My3-4.

**Radio Waves:** *Antarctica: Window in a Magnetic House (Simon Dresner, diagrams) O12-9; Whistlers (letter) D14-28.

**Radiocarbon Dating:** Libby, Dr. Willard F. (Biographical Sketch) J11-18; *Meteorites: New Clues to Old Mysteries (Nicholas Rosa, diagram) F1-13.

**Range Finder:** Directions for Making (A. Joseph, diagram) N9-27.

**Regeneration:** *Animals That Regenerate Body Parts (William Richards, diagrams) J11-9; Project: Study of Planaria (Robert Milanovich) J11-20.

**Richards, William:** *Animals That Regenerate Body Parts (diagrams) J11-9; *Life at 5,000 Fathoms (diagram) O12-9; *Light and Life (diagrams) S28-10; *Our Living Soil (diagram) N30-10; *Venoms: Clue to the Neuron Mystery (diagram) D14-11.

**Roberts, Dr. Walter Orr:** Biographical Sketch O26-16.

**Rocket Fuels:** Flame Temperature of (chart) D14-17.

**Rocket Plane:** X-15 Record Flight (N) S28-19.

**Rocket Sleds:** Stapp, Dr. John Paul (Biographical Sketch) N9-22.

**Rockets:** see also **Space Flight.** Amateur Rocketeers Convention (N) My17-19; Space Mice Test (N) O26-26; Soviet Venus Probe (N, diagram) Mr1-17.

**Rosa, Nicholas:** *Challenge of the Universe (diagrams) Ap5-4; Ewing, Dr. Maurice (Biographical Sketch) Ap19-28; *Ice Age Coming? (diagram, map) Mr1-4; *Meteorites: New Clues to Old Mysteries (diagram) F1-13; *Race to Inner Space (diagram) My17-10; *Radio Window on the Universe (diagrams) My3-4; *Seismic Waves: Key to the Inner Earth (diagrams) F15-6; *To the Stars and Beyond (diagram) Ap19-11; *Weighing the Earth, Why? (diagrams) J11-31.

**Rotation of Planets:** see **Astronomy.**

**Russia:** Dogs Orbit Earth and Return (N) S28-19; Releases Map of Moon's Far Side (N) D14-21; Venus Probe (N, diagram) Mr1-17, Ap19-26; *Yuri Gagarin First Man in Space (diagrams, map) My3-18.

S

**Sabin, Dr. Albert:** Biographical Sketch S28-20.

**Saturn:** Density (letter) N30-30.

**Schwarzschild, Dr. Martin:** Biographical Sketch Mr1-18.

**Science:** History of (T. Benjamin) J11-26.

**Science in Quotes:** Bates, Marston Mr1-3; Beck, Stanley D. N30-5; Carson, Rachel L. N9-3, My3-3; DuBridge, L. A. Mr15-5; Eddington, Arthur S. Ap5-3; Lyttleton, Raymond D. J11-3; Rostand, Jean F1-5; Shimer, John A. F15-5.

**Scintillation Counter:** How It Differs From Geiger Counter (letter) S28-30.

**Seebeck, Thomas:** Biographical Sketch F15-27.

**Seismology:** see also **Earthquakes.** Directions for Making Seismograph (A. Joseph, diagram) O12-27; *Seismic Waves: Key to the Inner Earth (Nicholas Rosa, diagrams) F15-6; *Tsunami (Robert C. Cowen, diagrams, map) S14-9.

**Shapiro, Dr. Harry L.** Biographical Sketch My3-22.

**Silk Worms:** Wanted for Research (N) F1-18.

**Sloane, Harold:** *High Energy from Outer Space (diagrams) N30-14; *Measuring and Mapping the Earth (diagrams) N9-4.

**Smog:** see **Air Pollution.**

**Snowflakes:** see also **Meteorology.** Snow Crystal Symmetry (T. Benjamin, diagrams) F15-18; Under Microscope (A. Joseph) O26-21.

**Soils:** *Our Living Soil (William Richards, diagram) N30-10.

**Solar Energy:** see also **Sun.** Solar Cell (N) O26-26.

**Sound:** see also **Ultrasonics.** *Beyond Hearing (Simon Dresner, diagrams) J11-4; Project: Measuring the Density of Liquids by Sound (Robert Schwartz) J11-19; Ray Gun Transmits Voice (N) Mr1-17.

**Space Flight:** see also **Artificial Satellites, Rockets.** Astronaut Up, Down, Safe (N) My17-18; Chimp Rocketed in Space (N) Mr1-16; First in Space for U. S. Will Be One of Three Astronauts (N) Mr15-16; *Ion Engine: Lilliputian Power for Space Travel (Simon Dresner, diagram) My3-13; Mice Radiation Test (N) O26-26; Project Mercury Tests (N) O26-27; Russian Dogs Orbit Earth and Return (N) S28-19; *Yuri Gagarin of Russia, First Man in Space (diagrams, map) My3-18.

**Space Medicine:** Man in Sealed-Tank Oxygen Test (N) Ap19-26; Stapp, Dr. John Paul (Biographical Sketch) N9-22.

**Spallanzani, Lazzaro:** Biographical Sketch J11-29.

**Spectroscope:** see also **Astronomy.** Making a Spectroscope (T. Benjamin, diagram) D14-19; *Radio Window on the Universe (Nicholas Rosa, diagrams) My3-4; Twinkle, Twinkle Little Star (T. Benjamin) O26-22.

**Spectrum:** see also **Light.** Measuring Wave Length of Light (T. Benjamin) D14-19; *Twinkle, Twinkle Little Star (T. Benjamin) O26-22.

**Stacey, Walter:** *Deep Freeze: Lab for Life Study O26-12; *From Egg to Embryo (diagrams) F1-10.

**Stapp, Dr. John Paul:** Biographical Sketch N9-22.

**Starnes, Richard:** *Crack That Girdles the Earth (diagram, map) O12-4.

**Subarsky, Zachariah:** *ATP: Energy Reservoir (diagrams) Ap5-9; Progress in Biological Sciences Curriculum Study S28-1T.

**Submarines:** see also **Atomic Submarines.** Midget Sub (N) Mr15-17.

**Sun:** Roberts, Dr. Walter Orr (Biographical Sketch) O26-16; Schwarzschild, Dr. Martin (Biographical Sketch) Mr1-18.

**Sundial:** New Type Developed by Student (N) S14-18.

**Sussman, Jack:** *Salmon Migration (diagrams) N9-9.

T

**Teeth:** Enamel (letter) F1-4.

**Telescope:** see **Astronomy.**

**Thermoelectricity:** Experiment (A. Joseph, diagram) F15-25; *Thermoelectricity (Simon Dresner, diagrams) F15-14.

**Tidal Waves:** Experiment (A. Joseph, diagram) S14-25; *Tsunami (Robert C. Cowen, diagrams, maps) S14-9.

**Timber:** Animal Destruction (N) Ap5-16.

**Time:** Calendars J11-C; New Second (N) D14-20.

**Today's Scientists (Current Biographical Sketches):** Brill, Dr. Robert, My17-20; Coates, Christopher D14-22; Detwiler, Dr. Vincent G. Mr15-5; Dubos, Dr. Rene J. N30-20; Ebert, Dr. James O12-22; Ewing, Dr. Maurice Ap19-28; Friedman, Dr. Herbert S14-20; Glaser, Dr. Donald F1-20; Libby, Dr. Willard F. J11-18; Roberts, Dr. Walter Orr O26-16; Sabin, Dr. Albert S28-20; Schwarzschild, Dr. Martin Mr1-18; Shapiro, Dr. Harry L. My3-22; Stapp, Dr. John Paul N9-22; Tombaugh, Dr. Clyde W. F15-22; Vishniac, Dr. Roman Ap5-18.

**Tombaugh, Dr. Clyde W.:** Biographical Sketch F15-22.

**Tomorrow's Scientists:** Projects—Astronomical Measurements of the Earth (Franklin F. Wilcox) S14-23; Corrosive Effects of Brackish Water (Harold Dodgen) Ap5-19; Denary-Binary Converter (Eleanor Wagner) Ap5-21; Determining Stress and Strain in Gears with Polarized Light (Leo Clayton) N30-23; Electrohydraulic Effect (Rand Evans) My17-21; Factors Affecting the Development of Bacterial Resistance to Antibiotics (Mary Sue Wilson) O12-23; Life Cycle of Cotumix, Japanese Quail (Sarah Johnson) S28-21; Life History of the Butterfly, Euptychia mitchellii (Stephen Hubbell & Thomas Pliske) S14-21; Light Responses of the Dawn Redwood Tree (Lawrence Nelson) F15-23; Linear Particle Accelerator (Joseph Golden) O12-25; My Experiences with Spiders (David Fears) N9-23; Measuring the Density of Liquids by Sound (Robert Schwartz) J11-19; Mutations in E. coli (John Schaefer) Ap19-29; New Research on the Properties of Royal Jelly (Kenneth Shearon) N30-21; Psychological Effects of Positive and Negative Air Ions (David Hunt) My3-23; Responses of Mosquito Larvae to Light (Ronald Weintraub) N9-24; Sliding Friction (Joan Monks) Mr1-20; Specialized Instrument for Photomicrography (Walter Jesewski) D14-23; Studies of a Root Growth Factor from Seedlings (Susan Brown) Mr1-19; Study of Load Bearing Abilities of Columns (Timothy Downing) F1-21; Study of Planaria (Robert Milanovich) J11-20; Survival in a Population of Tadpoles (John Young) Mr15-23; Ultrasonic Agitation of Liquids (Stewart Clark) Mr15-21; Utilization of Cornstalk (David Shubert) S28-23; Watching the Weather (John Rigdon) O26-17.

**Tsunami:** Corrected Diagram (letter) S28-30; Experiment (A. Joseph, diagram) S14-25; *Tsunami (Robert C. Cowen, diagrams, map) S14-9.

**Tuberculosis:** Dubos, Dr. Rene J. (Biographical Sketch) N30-20.

**Tyndall, John:** Biographical Sketch Mr1-26.

U

**Ultrasonics:** see also **Sound.** Directions for Making Generators (A. Joseph, diagrams) J11-23; Project: Ultrasonic Agitation of Liquids (Stewart Clark) Mr15-21; *Sound Beyond Hearing (Simon Dresner, diagrams) J11-4.

**U. S. Post Office:** Microwave System Used in Delivery (N) N30-19.

V

**Vaccine:** Measles Vaccine Tested (N) O26-27; Sabin, Dr. Albert (Biographical Sketch) S28-20.

**Venoms:** *Clue to the Neuron Mystery (William Richards, diagram) D14-11.

**Venus:** Soviet Space Probe (N, diagram) Mr1-17, Ap19-26.

**Virus:** Chicken Pox (letter) D14-28; Linked to Cancer (N) O12-19; Measles Vaccine Tested (N) O26-27; Rabies (letter) F1-4; Sabin, Dr. Albert (Biographical Sketch) S28-20.

**Vishniac, Dr. Roman:** Biographical Sketch Ap5-18; To Film Living Biology Series S28-18T.

W

**Water:** Chemical Blanket Prevents Evaporation (N) O12-20; Convection Demonstration (A. Joseph, diagram) D14-26; Dowsing (letter) Ap15-4; Fresh Water from Salt by Freezing (A. Joseph) D14-26; Water Temperatures Vary (A. Joseph, diagram) D14-26.

**Weather:** see **Meteorology.**

**Weismann, August:** Biographical Sketch F1-26.

**Wheat:** Bread Test (N) Ap19-26.

**Wiley, James:** *Animal Communication (diagrams) Mr1-8; Brill, Dr. Robert (Biographical Sketch) My17-20.